

Application No. 10/669,285  
Amendment dated January 18, 2005  
Reply to Office Action of October 20, 2004

Docket No. 1232-5165

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

1 (CURRENTLY AMENDED): A position detecting method comprising the steps of:

- forming an image of a mark on a sensor;
- performing a first process that processes ~~a raw~~ an image signal obtained ~~from~~ by the sensor with ~~plural parameters~~ respect to each of a plurality of values of a parameter of the first process;
- performing a second process that ~~determines an edge of a~~ obtains a feature value of each signal processed obtained by the first process ~~for each parameter;~~
- determining a value of the a parameter from a result of based on the feature values obtained by the second process obtained for each parameter and a reference value; and
- ~~calculating~~ performing a third process that obtains a position of the mark based on a an image signal obtained by the first process using the determined parameter value.

2 (CURRENTLY AMENDED): A position detecting method according to claim 1, wherein the first process is comprises zero phase filtering, and the ~~parameters for~~ parameter of the first process ~~include~~ comprises an order of a filter the filtering.

3 (CURRENTLY AMENDED): A position detecting method according to claim 1, wherein the first process is ~~polynomial~~ comprises approximation of the image signal using a polynimial,

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and the ~~parameters for~~ parameter of the first process ~~include~~ comprises an order of a the polynomial.

4 (CURRENTLY AMENDED): A ~~position detecting~~ method according to claim 1, wherein the ~~mark includes plural elements arranged at a certain pitch based on a design value, and said step of determining the parameter is based on a deviation of intervals between the elements from the design value calculated by using the result of the second process~~ feature value corresponds to an interval between elements of the mark.

5-6 (CANCELLED):

7 (NEW): A method according to claim 1, wherein said step of determining the value is performed based on a deviation of the feature value from the reference value.

8 (NEW): A method according to claim 1, wherein said step of determining the value is performed based on a variation of a plurality of the feature value with respect to each of the plurality of values of the parameter.

9 (NEW): A method according to claim 1, wherein the first process comprises a process for removing a noise in the image signal.

10 (NEW): A position detecting apparatus comprising:

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a detecting system to detect an image of a mark; and  
a processing system to perform a first process that processes an image signal obtained by said detecting system with respect to each of a plurality of values of a parameter of the first process, to perform a second process that obtains a feature value of each signal obtained by the first process, to determine a value of the parameter based on the feature values obtained by the second process and a reference value, and to perform a third process that obtains a position of the mark based on an image signal obtained by the first process using the determined value.

11 (NEW): An exposure apparatus for transferring a pattern to an object, said apparatus comprising:

a position detecting apparatus according to claim 10 for detecting a position of a mark formed on the object.

12 (NEW): A device fabrication method comprising steps of:

transferring a pattern to an object using an exposure apparatus as defined in claim

11; and

developing the object to which the pattern has been transferred.